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OF

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FOR

RECORDING FACTS AND ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES AND INSECTS.

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Extracts from the Report of the Council of the Zoological Society, read April 29, 1868.

THE following extracts are inserted in the 'Zoologist,' to the exclusion of some interesting and more original communications, with a twofold purpose; *first*, to serve the Society by inducing my readers to join so useful an institution, and *secondly*, to diffuse among my more distant subscribers valuable information which will scarcely be likely to reach them through any other channel.

The number of visitors to the Gardens during 1867 has been 556,214 against 339,217 in 1857 and 93,546 in 1847: this series comprises the highest and lowest numbers on record, excepting only the years of our international exhibitions, 1851 and 1862.

The loss sustained by the Society on the 6th of December, 1866, by the accidental fire which took place in the giraffe-house, was alluded to in last year's Report. The subsequent death of the old male giraffe reduced the Society's stock of this important animal to one adult female and a young male. Under these circumstances the Council thought it expedient to devote the special sum of £400 to the acquisition of a young female giraffe, which was imported last summer. The animal thus acquired makes an excellent match to the young male born on the 17th of March, 1867, in the Gardens, and both of them are now in excellent health and condition. The Council believe that this addition will enable them to keep up the breed of giraffes, of which no less than seventeen have been bred in the Society's Gardens.

The Society now possess three giraffes; a female born in the Gardens on the 25th of April, 1853, a male born in the Gardens on the 17th of March, 1867, and the female above mentioned as purchased on the 26th of July, 1867.

Another important addition to the Society's living collection during the past year was a young male walrus, purchased in November, 1867, at the cost of £204 10*s.* 6*d.*

This animal was captured in Davis's Straits by Captain Richard Wells, of the steam whaler 'Arctic,' belonging to Messrs. Alexander Stephen and Co., on the 28th of August last, under the following circumstances:—A herd of from two hundred to three hundred of these animals was met with on the ice by the 'Arctic' in lat. 69° N., long. 64° W. A boat's crew was landed on the ice, and the herd attacked

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and several individuals killed, amongst which was a large female. The body of the latter being attached to the boat and rowed towards the vessel was followed by a young male, which swam and dived around and refused to quit his deceased parent. This being noted, he was captured by a noose swung over his head and one fore limb, from the ship, and hauled on board. For some days the captive was kept tied to a ring-bolt on deck, and refused food altogether. Subsequently he was induced to swallow thin slips of boiled pork, and was thus fed until the vessel reached the Shetlands, when a supply of fresh mussels was provided for his use. A large box with openings in the sides was fabricated; and the animal, secured therein, was brought safely into Dundee. From that port to London the walrus was conveyed in the steamer 'Anglia,' under the care of the Society's Superintendent. [The death of this rare animal has already been recorded in the 'Zoologist.'] The only specimen of the walrus previously acquired by the Society was a young individual received in 1853, which had been brought home, in a vessel engaged in the seal-fishery on the coast of Spitzbergen, by Captain Henry, of Peterhead. This animal, however, was in a moribund state on its arrival, and lived only a few days in the Gardens.

In their last Report, the Council announced that they had sent out to Calcutta Mr. C. Bartlett to take charge of, and bring home to England, some valuable animals offered to the Society by their Corresponding Members, the Babu Rajendra Mullick, Mr. A. Grote, Dr. J. Anderson, and other friends in the East. Mr. Bartlett returned to this country with his living freight in August last, having unfortunately met with some severe losses on the voyage, but bringing safely the following collection:—

Two black Tibetan wolves (*Canis laniger*): presented to the Society by Lieut. Alexander A. Kinloch, 2nd Battalion Rifle Brigade, and Lieut. J. Biddulph, 19th Hussars.

One female gayal (*Bos frontalis*), two pelicans (*Pelecanus mitratus*), four demoiselle cranes (*Grus Virgo*), two female polyplectrons (*Polyplectron chinquis*), one white fruit-pigeon (*Carpophaga luctuosa*), one bronze pigeon (*Carpophaga ænea*), one singing pigeon (*Treron sphenura*) and one Entellus monkey (*Semnopithecus Entellus*); presented by the Babu Rajendra Mullick.

One Panolia deer (*Cervus Eldi*), one slow loris (*Nycticebus tardigradus*) and one hemipode (*Turnix pugnax*); presented by A. Grote, Esq.

One Indian badger (*Arctonyx collaris*), one slow loris (*Nycticebus tardigradus*) and eight water tortoises (*Emys*. sp. var.); presented by Dr. J. Anderson.

The following notes relate to some of the other more remarkable additions made to the Menagerie during the year:—

An additional example of the mooruk or Bennett's cassowary; presented by Commodore Sir William Wiseman, Bart., R.N., along with other valuable birds, Feb. 14.

Two specimens of the very beautiful lory of the Solomon Islands (*Lorius chlorocercus*); purchased Feb. 5.

A male example of the wild swine of Formosa (*Sus taivanus*, Swinhoe); received by the ship "Island Queen," January 17, having been obtained for Mr. Swinhoe by Mr. Gregory, Her Majesty's Vice-Consul at Tamsuy, and forwared to the Society by Mr. Swinhoe.

A pair of Saiga antelopes (*Saiga tatarica*, Pallas); received on deposit in November, 1866, and subsequently purchased, as being likely to do well in the Society's Menagerie.

A specimen of the carpet-snake of Australia (*Morelia variegata*, Gray), received from Queensland, purchased of a dealer.

A specimen of the Peruvian boa (*Boa Eques*,) from Guayaquil, presented to the Society by Prof. William Nation, of Lima.

A female Lyre-bird (*Menura superba*); brought to this country in the ship 'La Hogue' by its proprietor Mr. Ross, from whom it was acquired by the Society's Gardens.

An example of the parrot (*Coracopsis Barklyi*), described by Mr. Edward Newton as new at the Meeting of the Society held April 11; presented to the Society by Swinburne Ward, Esq., Her Majesty's Commissioner to the Seychelles, on the 8th of April.

A tortoise from Digué Island, Seychelles (*Sternothærus subniger*); presented by the same gentleman on the 23rd of March.

A pair of Ka-Ka parrots (*Nestor hypopolius*), from New Zealand; presented to the Society by the Acclimatation Society of Canterbury, New Zealand, on the 25th of April.

A boatbill (*Cancroma cochlearia*); obtained in exchange from the Zoological Gardens, Antwerp, on the 25th of April.

A male ground-hornbill, from West Africa (*Bucorvus abyssinicus*); presented May 6th by C. B. Mosse, Esq., Staff-Surgeon, and the more acceptable as the Society's collection previously contained three females of this rare and interesting species.

Two Eyton's tree ducks (*Dendrocygna Eytoni*); presented by the Acclimatization Society of Sydney, New South Wales.

Two young night herons in immature plumage; purchased May 14th, being apparently the young of Nycticorax cucullatus, of Western Africa.

Two yellow-rumped parrakeets (*Platycercus flaveolus*, Gould), from Australia.

A young kite, supposed to be the young of the square-tailed kite (*Milvus isurus*, Gould), from Australia.

Three Maugé's ground doves (*Geopelia Maugæi*).

Two Brazilian tree-ducks *Dendrocygna fulva*), from Brazil.

A male rosy-billed duck (*Anas peposaca*), from South America.

An Arabian bustard (*Otis arabs*), from West Africa.

A Senegal bustard (*Otis senegalensis*), from West Africa.

A specimen of the golden tiger cat of Sumatra (*Felis aurata*), received in exchange July 17th.

A pair of Sœmmerring's antelopes (*Gazella Sœmmerringii*).

A fine example of the black variety of the leopard (*Felis leopardus*, var. *nigra*); presented to the Society by Major John Pearse, Madras Staff Corps. This animal is stated to have been formerly in the menagerie of the Rajah of Mysore.

A specimen of the rare Australian parrot lately described by Mr. Gould in the Society's 'Proceedings' under the name of Geopsittacus occidentalis; presented to the Society by Dr. Ferdinand Müller, of Melbourne, and received by the ship 'Essex,' under the special charge of Capt. Ridgers, the obliging commander of that vessel. Dr. Müller, who forwarded this bird to the Secretary under the impression that it was undescribed, supplied the following particulars concerning it:—"This peculiar parrot was presented to me by Mr. Ryan, on whose sheep-station, on the Gawler ranges west of Spencer Gulf, it was obtained. The most extraordinary circumstance connected with this bird is, that it is *nocturnal!* It lives in the rocky caves of the ranges, and comes out at night to feed."

But perhaps the following list of animals which have been bred in the Gardens of the Zoological Society between the 1st of January, 1867, and the 1st of January, 1868, is the most interesting portion of the document.

MAMMALS.

Two Vulpine phalangers (*Phalangista vulpina*).
Three short-headed phalangers (*Belideus breviceps*).
Three yellow-footed rock-kangaroos (*Petrogale xanthopus*).
One great kangaroo (*Macropus giganteus*).
Three Gray's jerboa kangaroos (*Bettongia Grayi*).
Two Bennett's kangaroos (*Halmaturus Bennettii*).
Five Cashmere-shawl goats (*Capra Hircus*).
One markhoor (*Capra megaceros*).
Two hybrid goats, between Capra megaceros and Capra beden.
One giraffe (*Camelopardalis Giraffa*).
One yak (*Bos grunniens*).
One zebu (*Bos indicus*).
Three elands (*Oreas Canna*).
One bless-bok antelope (*Damalis albifrons*).
Two Wapiti deer (*Cervus canadensis*).
One Sambur deer (*Cervus Aristotelis*).
One Barbary deer (*C. barbarus*).
One Formosan deer (*C. taivanus*).
One Molucca deer (*C. moluccensis*).
Two Japanese deer (*C. Sika*).
One Persian deer (*C. Maral*).
Three Andaman pigs (*Sus andamanensis*).
One West African river-hog (*Patamochœrus penicillatus*).
Two Indian porcupines (*Hystrix leucura*).
Two viscachas (*Lagostomus trichodactylus*).

BIRDS.

Six Impeyan pheasants (*Lophophorus Impeyanus*).
Ten Swinhoe's pheasants (*Euplocamus Swinhoii*).
Sixteen Pallas's eared pheasants (*Crossoptilon auritum*).
Eight lineated pheasants (*Euplocamus lineatus*).
Four barred-tailed pheasants (*Phasianus Reevesii*).
One purple pheasant, or kaleege (*Euplocamus Horsfieldii*).
Two cheer pheasants (*Phasianus Wallichii*).
Seven black-backed kaleege (*Euplocamus melanotus*).
Twelve Japanese pheasants (*Phasianus versicolor*).
One Javan peafowl (*Pavo muticus*).
One brush-turkey (*Tallegala Lathami*).

Twenty-six hybrid turkeys (*Meleagris Gallo-Pavo*).
Twenty-one rufous tinamous (*Rhynchotus rufescens*).
Two varied hemipodes (*Turnix varia*).
One black-necked swan (*Cygnus nigricollis*).
Seven ruddy-headed geese (*Chloëphaga rubidiceps*).
Three ashy-headed geese (*Chloëphaga poliocephala*).
Seven ruddy shieldrakes (*Tadorna rutila*).
Three variegated shieldrakes (*Tadorna variegata*).
Thirteen Bahama ducks (*Pœcilonetta bahamensis*).
Five Australian wild ducks (*Anas superciliosa*).
Five dusky ducks (*Anas obscura*).
Three white-crowned pigeons (*Columba leucocephala*).
Two vinaceous turtle-doves (*Turtur vinaceus*).
One crested pigeon (*Ocyphaps lophotes*).
One Bartlett's pigeon (*Phlogœnas crinigera*).
Two stock-doves (*Columba œnas*).
One turquoisine parrakeet (*Euphema pulchella*).
Three crested ground-parrakeets (*Calopsitta Novæ-Hollandiæ*).
One sun-bird (*Eurypyga Helias*).
One common cassowary (*Casuarius galeatus*).
One black-crested cardinal (*Gubernatrix cristella*).
One rufous-necked weaver-bird (*Hyphantornis Textor*).

REPTILES.

Six great lizards (*Cyclodus Gigas*).
Two rattlesnakes (*Crotalus durissus*).

EDWARD NEWMAN.

The Cutting Ant of Texas (Œcodoma Texana, *Buckley*).

By GIDEON LINCECUM.*

IN many portions of Texas this species of ant is quite numerous and troublesome. It is capable of, and actually does, perpetrate more real perplexing injury to the horticulturist and farmer than all the other types of Texan ants put together. In form and colour the larger varieties of them do not differ in appearance very much from the agricultural ants. A great portion of our citizens speak of these two ants without distinction, as being the same species: there is, however, a well-marked difference in their community regulations, in their manners and customs, in their mode of constructing their cities, in their peculiar food and manner of preparing it, and in their civil and military governments.

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* Reprinted from the 'Proceedings of the Academy of Natural Sciences of Philadelphia.' 1867.

There are five varieties or castes in this species, all of which may be seen in the same community, or city as I prefer to call it. They vary in size from that of a drone honey-bee down to near that of the little black erratic ant; and their duties and vocations are as variant as their sizes. The largest size have wings and are the mother ants. They dwell in the ground in sandy lands, and one of their long-established cities will, on an average, occupy at least two square rods of surface. The area of the city is considerably elevated, often one to two feet, and sometimes even more. The earth which is thus thrown up, and which is universally sand, is thrown out from their numerous and capacious cells below, and from their extensive tunnels or subterranean passages. To their cells they have many holes or places of entrance, and some of them are tunnelled off several hundred yards.

It is known to many observant Texans that in all the larger cities the ants have penetrated the earth to water: this accords with my not very limited experience on the subject. I know of a number of wells which were intentionally sunk in the cutting-ant hills to procure water, and I have been informed by the owners of these wells that ant cells, tunnels and live ants were found all the way down to the water. I have myself seen and drank water out of eight of these wells, and have accounts of many others. I have not heard of a failure in any attempt to obtain water in a cutting ant hill. Mr. G. W. Brooks states that, in Chappel Hill, Washington County, Texas, Columbus Pearson dug a well in an ant hill, and obtained plenty of water at a depth of thirty feet. The facts in this case worthy of notice, and for which it is here recorded, is the manner in which the ants had also sunk two wells to the water. The walls of these wells were travel-worn and stained of a dirty brown colour, presenting the appearance of having been in use for years. Mr. Pearson states that, if these ant wells had been opened properly, a bucket could have been let down the largest one at the outset.

Dr. Fechtig, of Brenham, informed me that he had been making observations on the cutting ant for some months; and some of his discoveries, which he was kind enough to communicate to me, are valuable and of an interesting character, particularly as they afford additional testimony in favour of observations I have made in reference to the disposition of the dirt which comes out of their tunnels, &c. These passages are always commenced within the compass of the city mound: the sand that is taken from the tunnels is always thrown back on the mound. These tunnels are made at the depth of eight to twelve inches, and in the direction of the object for which they are excavated. Sometimes, as I will show presently, on extraordinary occasions they are carried at a much greater depth. Dr. Fechtig's case, which I will now relate, was a tunnel from one of their cities to a neighbouring well, the tunnel entering the well ten or twelve feet below the surface of the ground. The well being walled with oak timbers, the ants had cut their way through to gain access to the water. In performing the boring through the thick oaken curbing, they threw down into the well so much saw-dust that the people were forced to strain the water previous to using it. On examination Dr. Fechtig found that a quantity of oak chips, similar to those which had been separated from the well-water, had also been thrown out on the ant mound.

Situated in a garden at Austin, Texas, there was a very large, very populous and seemingly prosperous cutting-ant city: the ants had for years, in spite of many patent traps and newly-discovered ant poisons, damaged the garden extensively. The proprietor of the garden at last conceived the idea that he would try to drown them, and for this purpose dug a large basin-formed pit in the ant mound, and led trenches into it right and left from the hill-side above the ant city, to convey the water into the basin when it should rain. Not long after this preparation was completed, there came a tremendous rain storm. Large quantities of water rushed along the ditches into the basin dug in the mound. To the gentleman's surprise the basin did not fill, but seemed to send forth hollow sounds. After the rain was over it was found that all the water which had been conveyed into the basin had been swallowed up. There is a creek with a flat rock bottom about seventy yards from the ant hill, and it was discovered that the water from the trenches had rushed down the wells of the ant city, washing out down to the rock (twenty-two feet) an immense hole, thence along a great tunnel on top of the rock, to the before-named creek, where the entire sluice, charged with millions of ants and sand and mud, made its escape into the creek.

Under a beautiful wide-spreading live-oak (*Quercus virens*) on the west border of the town of La Grange, Texas, there was an extensive and flourishing ant city. The city mound was large, occupying the entire area overshadowed by the live-oak. Nearly on a level, and not exceeding eighty yards from the ant hill, there was a considerable pond of filthy water, which, being in the street, the town authorities ordered it to be drained. A ditch was opened along one side of the street, which intersected the ant mound near its centre, and for the purpose of inundating and drowning the ants, the workmen let the water into the ditch, and when it reached the mound (which had been ditched through to its further side) it found many open passages, down which it flowed quite freely: it was near night when the workmen left it, with the water passing into and seeming to be rapidly enlarging the hole it had already opened in the mound. The workmen and a number of the town people visited the place next morning: the pond was dry, and the ant mound had also disappeared; and what was more wonderful still, the large live-oak had settled down into the chasm that had been made by the disappearance of the ant mound, until the lower limbs of the tree were resting on the brink of it. (The lower limbs of a prairie live-oak are seldom more than six or seven feet above ground.) The outer ends of the very numerous live-oak roots were still clinging by their long ramifications in the walls of the great pit all around, and the large tree was swinging securely upon this net-work of roots as upon a hammock. But where did the water, mound and ants all go to? was the question among the La Grange folks. The Colorado river passes in its deep channel three hundred yards distant from the ant hill, and the popular supposition was, that the mound, ants and all, had passed through their great tunnel, which they had previously excavated, into the river. Several years have gone by, and still when it rains the pond vents itself through that ant chasm, and the live-oak, though still green and thrifty, has settled deeper in the ground. I know of many other wells and tunnels that were made by the cutting ants, but as I have recorded a sufficient number of them here to establish these great works as a characteristic trait in their natural action, it is deemed unnecessary to add any more.

All the sand and other material that is seen piled on the ant mound comes from the wells, tunnels and cells which are excavated for the accommodation of the ants. The work required to throw up these quite conspicuous mounds must have consumed many years, as well as an immense amount of labour. All the sand-carrying labour is performed by the smaller sized ants, principally by the very smallest: these are of a dingy brown colour, and when crowded have a woolly appearance. These little fellows are lazy and extremely slow in their motion, seeming to perform their daily work with great reluctance: they are often found crowding in each other's way about the gates of the city, and do not seem to feel any interest in what they are doing, which is to carry sand day by day: for their size they carry large loads, but they lose the advantage of the big loads by their slow motions. The larger types of this species, which move with greater celerity, pay no attention to the sand-carriers, but pass out and in, walking over them and their big loads of sand as if they were the pavement. While I observe the slow, careless action of these lazy little mound builders, I cannot avoid the conclusion that they are slaves.

As the cutting ants perform their destructive works mostly during the night, I have not made sufficient observation on their nocturnal action to state certainly that they employ their slaves in the leaf-cutting business at all. They have large mandibles and sharp teeth, and I think it likely that they are capable and, perhaps, do participate in the labours and duties of all the departments in the national works. The cutting ants subsist entirely on the leaves of vegetables: they will eat the leaves of various trees, shrubs and some herbaceous plants. I have not observed them eating of any of the grasses. Sometimes during warm spells in winter, when, as I suppose, their provision stores have run short, I have seen them cutting and carrying home the buds of the long moss (*Tillandsia usneoides*). I think, however, that this alternative is resorted to only in periods of great scarcity, as I have never observed them collecting the moss during summer, or at any other time while the season of green foliage continues. They seem to have a regular and well-disciplined corps of foragers, and these, after a suitable tree has been selected by their scouts for them to work at, go forth about twilight, and, ascending the designated tree, frequently the tallest willow-oak (*Quercus phellos*), commence the work of destruction. They cut the green leaves into pieces not much less than a five-cent piece, and seizing it near one corner with their capacious mandibles elevate it, and tilting it backwards over the crown of the head, it falls edgewise between two strong spines of horns, which stand erect at the back part of the forehead: having their load thus adjusted, which, to the observer, seems to stand on its edge on top of the head and lengthwise with the body, they hasten away to the appointed place of deposit. It is quite an interesting sight to observe with what precision and celerity they can edge their piece of leaf along amongst hundreds of their fellow-labourers who are all carrying similar burthens, while they are meeting on the path an equal number of workers who are hurrying back to the tree empty. They deposit the leaves on the ground at the place appointed for curing them, where they are left to dry in the sun through the succeeding day. Sometimes the new-cut leaves are deposited near the entrance to the city; at other times they are strewed thickly along the path from the tree to the city; and not unfrequently they are thrown down in a pile near the root of the tree from whence they were taken. In either case they are left exposed all day in the sunshine, and they are, during the succeeding night, carefully gathered up and taken into the city: this rule obtains in autumn: they do not cure their leaves until towards winter. All summer time they are carried directly from the tree into the city. Whilst the dried leaves are being stored away, the foragers are engaged in cutting and laying out a quantity of fresh leaves, which undergo the same processes of curing and storing as the previous lot; and so on through the season for storing up food for winter; but should a shower of rain fall upon and wet the laid-out leaves while they are out drying, it renders them unfit for food, and they are not stored. I have noticed many piles of these spoiled leaves rotting on the ground that had been damaged by being caught in the rain.

In my observations on the habits of the cutting ants, I have not discovered them eating anything besides the foliage of various plants; neither have I ever noticed them carrying anything else into their cities. Prof. S. B. Buckley, who is a very close and accurate observer, states that he saw them carrying hackberries (*Celtis occidentalis*), and that they eat insects, tumble-bugs, &c. The hackberry has a sweet pulpy covering, and I think it likely that if one of the leaf-eating ants was to find a hackberry, it would try to carry it home, but it being a perfect globe, a little too large for the span of its mandibles, I see not how it could effect it. As to their feeding on insects, I shall not pretend to deny it, for these wonderful, cunning and very sagacious ants doubtless perform many habitual actions that have passed unnoticed in my eighteen years observation. It is stated that this species of ant does not lay up stores of provisions for winter supplies. I have not opened one of their cities during winter, and therefore cannot assert that they do; but from the immense quantities of leaves collected by them during the autumnal months, which are carefully sun-dried and taken into the city, I should feel at a loss to say, if it is not intended for winter food, what other use they can put such quantities of leaves to, and furthermore, when it is known to be the kind of food upon which they subsist. It is also known that they construct cells from fifteen to twenty-five feet below the surface,—below the line of change of temperature,—and in these deep subterranean apartments for their winter quarters, they would not become torpid, but would remain active. Now, if during the warm season it is necessary for them to consume the almost incredible amount of leaves which we see them daily carrying in, it becomes a matter of surprise—an unaccountable thing indeed—how they can make out through the winter months without anything to eat, when we know that they are not in a torpid state, but lively and active.

In this vicinity within the last two years (1861) the cutting ants have greatly diminished. Many large cities have dwindled away to a few thinly populated holes, whilst many others are entirely depopulated. This, I think, is mainly attributable to the protracted dry weather. With many other species, particularly the agricultural and little black ants, long droughts seem to favour their increase. Not so with the cutting ant: they evidently decline. A seven years' drought would cause their wells to dry up as it did many of the wells belonging to the genus Homo. I know of several very pretty homes that were evacuated the present year by human families, on account of the failure of their wells: their wells dried up, and as they could not deepen them sufficiently to obtain a supply of water they were obliged to leave their long-cherished and well-fixed homes. The ants have done the same thing, and as I think for the same reason: their wells also failed, and they have perished for want of water, or have emigrated to districts more congenial to their peculiar mode of life. Anyhow they have greatly diminished, and many large cities are actually depopulated and lying in ruins.

On the 1st of August, 1861, I discovered in a grove of thick timber and much undergrowth a great many cutting-ant holes: they were all around in the bushes, extending perhaps over an acre of ground: they were all alike of recent date: their newly thrown up little heaps of fresh sand was what first attracted my attention. Finding them there on the hill-side, and actually boring holes in the thick woods, was a performance so entirely contrary to their customary habits that I was led to the examination of the matter, and if possible to ascertain the cause of this strange unantlike proceeding. My first impression was, there being a large and very ancient city a few hundred yards distant from the new settlement, that it was the work of the recently thrown off queens from the old kingdom; that the young queens had stopped short in the shady woods in consequence of the hot dry weather, and were setting up for themselves in a new style, it being on a declivity and in a densely shaded woodland. I, however, excused them for all these flagrant deviations from their long-established customs by laying it to the continuous drought and hot weather. I did not leave them until I had marked the place that I might visit them again, and find out how such a multiplicity of new settlements in so small a track of country would manage in the future. I then paid a visit to the large old ant city spoken of above: I had many times within the preceding twelve years, visited and made observations on its extraordinary public works. When I came there I was astonished to find that its inhabitants were all gone. I found only the large old mound of sand, now smoothed down by Time's sweeping winds and the passing cattle, but there were no inhabitants—all had disappeared: they had evidently emigrated to the new settlements I had encountered down the hill-side in the thick shady forest, and the inhabitants thereof were not, as I at first surmised, the newly-commenced communities of the young queens, but emigrating parties who had gone out from the old city in search of water; their wells having failed they could no longer remain in the city, and having left it had proceeded lower down the hill, and, hoping to find water, were sinking many new wells. Subsequent observations have confirmed me in this opinion. The new settlements in a short time were evacuated: having been unsuccessful in obtaining water at the new place, the ants had either died out or gone to some other district. In accordance with my observations on this subject, I am forced to the conclusion that the drought continued too long for them; that in districts where the wells are liable to dry up they often perish. I find that the kingdoms that are located near a constant stream, are in a flourishing state, and have continued so through all the time of the protracted dry season.

The cutting ants plant seeds of various trees, vines and other plants. When they locate a city in bald prairie, which is often the case, where they cannot procure the seeds of trees, they cultivate the prickly poppy (*Argemone Mexicana*), the most appropriate plant for their purpose that grows on the prairie. The seeds of this poppy are planted over the greater portion of the crown of the city mound; the plant springs up during the autumnal rains, forms strong roots in the course of the winter, and by the time the sun becomes oppressively hot the next spring it has grown up two or three feet high, with umbrageous green foliage and many large white flowers, and affords ample shade to the city. When the ants locate a city on some sunny point near the timbered lands they do not plant the poppy, but appear to prefer certain trees and vines for shade: for this purpose they plant the seeds of the prairie dogwood (*Viburnum dentatum*), yopon (*Ilex vomitaria*), hackberry tree (*Celtis occidentalis*), gum elastic tree (*Bumelia lycioides*), the mustang grape (*Vitis Texana*), Cocculus carolinus, and occasionally the prickly ash (*Xanthoxylum fraxinium*). It is often seen in cases of long-established cities, that grape vines spread themselves over the tops of the grown-up shade-trees, and the large luxuriant foliage becomes so dense that it forms a shelter sufficient to turn a smart shower of rain: from the scorching rays of the sun these thrifty vines afford thorough protection. Notwithstanding the notable fact that all the plants these ants cultivate produce nuts, pulpy fruits and large seeds, I have not discovered that they make use of any of them for food: they appear to be a selection for shade, and so far I have not observed that they have any other use. If, however, after a more careful investigation, it shall be discovered that they cultivate the vines, trees and fruitful shrubs for the double purpose of both shade and food, we must accord to them a share of sagacity and far-reaching forethought almost incredible.

I have occasionally discovered colonies of small-sized red ants, which in form resemble the smallest type of the cutting ants: they dwell in the ground: I have not seen them cutting or carrying leaves: I have observed them thickly covering a greasy rag, places where syrup had been spilt, and where coffee-grounds had been thrown aside at my hunting camps: they are not often met with, and, as I now think, never will be, so long as the superior and very numerous race of cutting ants inhabit the land. The smallest type found in the cities of the cutting ants, which I have before alluded to as being slaves, are in shape, size, colour, and all their peculiar motions, precisely the same. How happens it that the same species of ant should occupy two very distinctly marked conditions? In one he dwells in small colonies, makes very little mark, is never wealthy, and does not remain long at the same station: in the other he is a slave!

How the cutting ant manages to make slaves of the smaller race is as yet an unsolved question. The cutting ant does, to be sure, perform all his thieving operations at night, or by the aid of an underground passage, if in the day time. Consequently our observations on the mode of carrying on the slave-trade must necessarily be tedious and limited; but the cutting ants have what I take to be slaves in great numbers; and the same type that constitutes their slave population is found sometimes free, but very poor and in straggling communities. The fact that these little sand-carrying ants are a servile race, I think cannot well be denied. If they are produced from the eggs of the cutting ant by a peculiar process of feeding, as is the case in producing the various types found in a community or hive of honey bees, then the conclusion will follow, that there are no proper communities of the smaller type, and the little nests that I have occasionally seen of them were nothing more than companies of badly managing absconding slaves.

February 26, 1861. There was a heavy rain last night. To-day it is very clear and pleasant: thermometer 70°. Everything that has life in it or can grow is in motion. I was out on the prairie botanizing, and while resting in the shade of a large live-oak, which was nearly in full bloom, I discovered great numbers of all sizes of the cutting ants ascending and descending the tree. On the ground beneath the tree were thousands of the ants carrying pieces of the leaves of various plants. The greater portion were carrying the leaves of the live-oak: some of the leaves were faded and nearly dry, and all were the growth of the previous year. Seeing no ant-hill near I undertook to find out how far they carried their leaves through the thick grass. In a short time I discovered that they carried them above ground but a short distance to a little pile of leaves and trash, under which they went dragging their cut leaves with them. Turning up the little pile of leafy trash, which seemed to have been driven there by the winds, in a depression of the ground that was probably an old horse track, there was a hole a full inch in diameter. Not a particle of dirt had been thrown out around it, and yet the hole was large and slanted away to the north-west. There were thousands of the ants at work in the shade of the live-oak, gathering up the leaves that were being constantly cut down from above, and on closer scrutiny I found several other holes into which they were going with leaves: these holes also slanted off under the surface, but had no earth thrown out around them, and were all alike concealed with leaves and little sticks: all the holes were crowded with the ants going in with leaves, or coming out empty. With such a number of ants and so many holes, one would expect to find heaps of earth piled out around them; but such was not the case. The holes were the outer termini of the subterranean passages they had run out from their city, about fifty yards distant, and piled on their city mound lay the sand that came from the passages: these passages, or tunnels, are constructed for the purpose of avoiding the almost insurmountable difficulty they would have to encounter in the effort to carry their leaves through the tangled grass, and also apparently to make it possible for them to obtain food in times of scarcity during the cold weather. The cutting ants are very easily stiffened with the cold air, and cannot succeed in scrambling through fifty yards of thick grass with a leaf on a cold day; but with the under-ground roads, in almost any kind of weather, they can go to the terminus, hastily run out, and snatching up a recently-fallen live-oak leaf, take it home through the tunnel without difficulty. I saw the ants carrying nothing but leaves during this day's observation, neither have I ever observed this species collect any other kind of food except small flowers and the petals of larger ones; but these are no more than tender leaves. At the ant city there appeared to be a great turn out of the ants this fine day: I noticed four sizes of them. Most of the slaves were engaged packing out sand upon the city mound: there were, however, a considerable sprinkling of them in company with the larger sizes packing leaves. I noticed also a greater number of their giants, walking to and fro with the labourers, but they performed no work that I saw. The giants are large, and have a large head with strong mandibles: they are well-formed for the execution of much of their kind of labour; but I did not discover that they did any work, though they were passing up and down the tree and along the road with the labourers all the time. All the small ones—the slaves, and the second-sized ones, which may also be slaves—were unremitting in their labours: the third size, or class, also carried leaves quite busily.

This species of ant often carry their subterranean roads to the distance of several hundred yards from the city in grassy districts, but where the grass has been destroyed they do not construct the underground passages, but travel over land in nicely cleared-out roads, which are seen radiating from the city mound and extending to various trees, or spots of herbage which produce suitable leaves for their subsistence. To see one of these well-cleared roads extending in a continuous line from the city to some tree or garden two or three hundred yards distant is indeed remarkable. This fact, in a district nude of grass, occurs so often that it cannot be attributed to chance or blind instinct. Some of the engineers, in their excursions in search of supplies, often wander to a distance of four or five hundred yards, or even further, and finding a plentiful source of good food, would find no difficulty in conducting parties the best route to it, and soon a good smooth road is constructed, over which in crowds the workers are seen through the night, or in cool cloudy days, transporting the leaves to the city: this is their mode, invariably, in a country where the grass has been destroyed, and we can see and understand the method and the purpose for which they work; but in a country which is heavily coated with high grass it is not so easy to discover by what process they lay off a tunnel and successfully carry it in a direct line to the selected tree or garden spot a quarter of a mile distant, and sometimes beyond a considerable streamlet of running water. On one occasion, on a log that lay across the Ye-Gua Creek, the ants passed over to a gentleman's garden, and were rapidly cutting his vegetables to pieces. The owner, hoping to rid the garden of these troublesome insects, cut the log away, and it floated off down the creek: he was mistaken in his calculations, for it was but a few days after when the ants were ravaging the garden in as great numbers as they were previous to the removal of the log. After searching unsuccessfully for some interlocking tree that might afford them a passage, it was observed that the ants came out from several holes, situated on the creek side of the garden. Subsequently it was discovered that, on a large ant mound crowning a sandy point near the edge of some post-oak timber, two hundred yards from the creek, there were quantities of the black soil of the Ye Gua bottom thrown out, proving that the second visit of the ants to the gentleman's garden had been effected by a tunnel beneath the bed of the creek: the channel of the creek, at that place, is fifteen or twenty feet deep, and from bank to bank on top of the bluff about thirty feet. By what degree of the instinctive powers was all this engineering and truly great project accomplished!

I have never seen the cutting ants fighting among themselves, or with any of the other species. I look upon them as the most peaceable, the most sagacious, and at the same time the most destructive, of the ant kind.

On the Nesting of the Egyptian Vulture (Neophron percnopterus).

By Captain H. W. FEILDEN.

THIS bird, common to the three continents of Europe, Asia and Africa, is abundantly distributed throughout India, extending from the Himalayas to the South, though Jerdon says it is unknow Lower Bengal.

The habits of this bird are disgusting; its principal food is hu ordure. Though it feeds off carrion, when obtainable, its bill is able to compete with that of the true vultures, and the skin of a l animal would resist its attacks for a long time. Repulsive as ar habits of this bird it occupies an important place in the econon Nature, supplying scavengers amongst races having no regar sanitary arrangements.

The "Neophron" walks well and at a considerable pace, liftin legs high and swaying the body from side to side. It may be at all hours of the day, circling over cantonments with never-t wing: its flight is strong and vigorous, soaring in great circles the true vultures. The difference in colour between the adult young is very marked, the old birds being yellowish white with l ends to the wings, the young having a uniform plumage of brown, and in an elder stage mottled brown and white. I hav seen any breeding in the immature plumage.

Jerdon says that they breed on rocky cliffs, on large buildings occasionally on trees: here (in the neighbourhood of Secunder they nest entirely on rocky granite ledges. January, Februar March are the usual months for breeding in. The nest is a collection of sticks, lined with rags, hair and any soft ma the birds can procure. The same breeding-places are ann returned to.

Not having arrived in India till the end of March, I co myself fortunate in getting some eggs this season. On the April a friend procured an egg for me: there were two in the one addled and the other ready to hatch. Again, on the 23 April my friend found another nest, with a young bird and an e nearly ready to hatch that on making a small incision in the the youngster inside poked his head through the aperture, brea hole the size of a sixpence. These eggs are not as highly co as Mr. Hewitson's beautiful illustration; their ground-work is scattered over with rusty brown spots, thickest at the larger en general appearance not unlike some eggs I have seen of regalis, but larger. I am told the eggs vary from white to dee The length of the egg is two inches and three-quarters and the two inches.

I have found three nesting-places since I came here, but al s unknown in

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had young in the nests. On the 20th of April, looking after a blu
pigeon on the top of a lofty rock, I noticed, half way up, the head o
a "Neophron" peering over a ledge: this was evidently a nesting
place, for the face of the rock was streaked white with the draining
from the nest, and at the bottom of the rock lay a pile of bones
I endeavoured to climb up to the nest, but failed. Clapping my
hands and shouting made the bird fly off slowly: lazily circling tw
or three times round the rock, it returned to the ledge and looke
inquiringly at me, putting its head first on one side and then on th
other. I went in search of my horse-keeper, who can climb like a
ape, and, returning with him to the rock, found both old bird
sitting on the ledge: the horse-keeper with his bare feet scramble
up the face of the rock with great ease; when within three feet of th
ledge one of the old birds flew off; the other would not budge, bu
put its head down, snapped its bill and bristled up its feathers
before it was dislodged I had to cut a stick and hand it to the ma
and not until the bird was pushed with the stick would it leave th
rock. There were two young birds in the nest, one apparently abo
a week old, the other just hatched: they were bare of feathers, an
looked like large pigeon squabs.

H. W. FEILDEN.

Secunderabad, May 5, 1868.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from Zool. S. S. 1252).

Whimbrel.—May 2. First appearance. Some large flocks of thes
birds have frequented the marshes during the month: on the 13t
I counted up to sixty-one feeding in some low meadow land; and, o
the same day, spent some time in attempting to stalk another lot, i
the same neighbourhood, not less than double this number. Thes
birds are far more a land bird than the curlew, feeding almo
exclusively in our marshes, retiring occasionally to the flats to re
and bathe: they are very fond of washing themselves, and when th
employed it is an interesting sight to watch them through a glass
they splash about in the water like ducks, wading out breast dee
and striking the water with their wings, flinging it around in shower
After the bath they stand on the fore-shore preening their feathers,

gently fanning their wings, as if to dry them. Others again will be seen standing perfectly motionless on one leg, the other foot dangling from the body, the head thrown back between the shoulders. The whimbrel remained with us to the 27th of May: on the 29th they had all left the district; on this day I saw a single pair on the "flats"—sole remnant of the large flocks seen on the 27th.

Dotterel.—An old gamekeeper, well acquainted with these birds, reports seeing a "trip" in the marshes on Sunday, the 26th of April, numbering about twenty birds. On the 4th, 5th and 6th of May Mr. J. H. Gurney and I walked for many miles over the Humber marshes in search of dotterel, without, however, seeing any. On the 19th a single bird alighted within ten yards of one of my labourers; and another, probably the same bird, was fired at by a brick-maker near the same place on the 23rd. Dotterel arrive in Lincolnshire about the last week in April, remaining for some days on the hills in the wold district before going down into the marshes, where we usually see them during the first week in May.

Gray Plover.—Like the dotterel these birds have been very scarce, the largest flock seen by me during the month numbering nine birds. First seen on the flats on the 4th of May; last observed on the 26th, when I examined through the telescope a small party of seven, two of them mature birds—splendid fellows in full summer dress.

Reeve.—May 20. To-day, when riding in the marshes, I noticed eight birds, like large sandpipers, feeding in a fifty-acre grass field adjoining the Humber. Two hours afterwards, on returning with my gun, found them still feeding within a short distance of the same place: while thus engaged they walked very close to the ground, not unlike knots, but when on the alert stood considerably higher than these birds do. My only chance of a shot was to walk up the drain: the noise made in doing so probably alarmed them, as they rose out of shot, going away in close order, at a great pace, and silently. I was afraid they would leave the field; fortunately, however, they turned, now coming directly towards me, but again changed their line of flight, going towards the Humber, giving me the chance of a long cross-shot: having a green cartridge in the left-hand barrel of my breech-loader, I fired well ahead of the flock, and with effect, one bird falling dead and another winged; the remainder, now reduced to six, going in a direction across the Humber. As they crossed the embankment I was sorry to see another bird leave the rest and pitch downwards towards the flats: this bird I did not find: a labourer who works on the embankment picked it up and brought it to me on the 23rd. These birds were all reeves, and I believe the remainder of the flock were also reeves, as they appeared all of the same size: they are in summer plumage, but differ more or less in their colouring: they are now in the collection of Mr. J. H. Gurney, jun. I found the stomachs of two of these birds, forwarded by Mr. Gurney, contained the remains of some small bronze-winged beetles, common in our pastures, and earwigs, also several small sharp stones: these stones, felspar and quartz, must have been taken into the gizzard at a great distance from this place, and probably in a granite district.

Black Scoter.—Flocks of this species seen in the Humber during May. A flock examined by the telescope on the 4th was composed of birds in pairs, the male and female swimming together. About thirty of these birds inspected by the glass on the 16th were nearly all females; I could only make out three mature males. Last seen on the Humber May 18th.

Tree Sparrow.—May 27. Found two nests of this species to [illegible] in the marshes, in a pollard hawthorn overhanging a drain: the nests were dome-shaped, constructed of dead grasses, and lined with fragments of wool: I only found a single feather. The eggs resemble those of the domestic bird, but are paler.

Cuckoo.—I never remember cuckoos so plentiful as they are this season: this is a subject of general remark. A friend lately found a cuckoo's egg in a hedgesparrow's nest in his garden: he never heard of Dr. Baldamus's theory, and described the egg to me as nearly resembling that of the hedgesparrow. I got yesterday a cuckoo's egg from a hedgesparrow's nest in the orchard: this egg, however, in no way resembles that of the hedgesparrow.

Blackbird.—There is a blackbird's nest in the middle of a honeysuckle in the garden: this nest originally contained four birds, which, alarmed by the too close inspection of my household, prematurely flew from the nest, and, as I never saw them afterwards, probably became the prey of wandering cats. A day or two after the departure of the brood the hen bird began laying again in the old nest, and we have now a second brood of four birds in the nest nearly ready to leave it. The old birds are constantly feeding them, in spite of the frequent croquet playing close to the nest: they are now too large for the mother to cover them with her wings. I see her in the evening sitting on the edge of the nest, their heads resting against her wing.

Wood Pigeon.—May 18. The crop and gizzard of a wood pigeon shot this afternoon contained nothing but the berries of the spurge laurel (*Daphne Laureola*), a shrub which hitherto I have not found in the neighbourhood.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
June 5, 1868.

NOTICES OF NEW BOOKS.

'*Coleoptera Hesperidum; being an Enumeration of the Coleopterous Insects of the Cape Verde Archipelago.*' By T. VERNON WOLLASTON, M.A., F.L.S. London: Van Voorst. 1867. Demy 8vo, 285 pp. and an outline Map.

IT has been my privilege to receive every one of Wollaston's volumes as it issued from the press, and I may truly add to derive pleasure and profit from its contents. I have read with the most scrupulous care every sentence he has penned bearing on principles, and if I cannot lay claim to having paid equal attention to his characters of genera and species, it is because they are not designed for one who, like myself, has little or no knowledge of the objects they are written to differentiate, and certainly, during the short remainder of my life, I shall never make their acquaintance.

Mr. Wollaston is one of the very few English naturalists who did not receive with open arms the very plausible—I may perhaps say the very beautiful—hypotheses of Mr. MacLeay and Mr. Darwin, on the ground of their becoming so fashionable. When I was beginning Natural History I found that not to be Quinarian was not to be received into scientific society—was, in fact, ostracising myself; and now, in the sere and yellow leaf of my career, I find myself equally unable to become Vestigian, or Lamarckian, or Darwinian, whichever may be the more appropriate and descriptive term, and for a second time I am ignored as a man of science. I have seen Quinarianism and its fiery advocates depart to their eternal rest; but Darwinism is still in the zenith of its fame, and has attained this fame quite as much through the instrumentality of a few injudicious opponents as through that of a multitude of unflinching advocates. It has always seemed to me that in order to oppose MacLeay or Colenso or Darwin, or any other great innovator successfully, it is necessary to think out the matter as they have thought it out. A zealous divine may feel very irate with Colenso or with Darwin, but he cannot dash off such a sixpenny tract after dinner as the world will be content to receive as a satisfactory reply. Mr. Wollaston sees this, and without making Darwinism a prominent object, either to attack or defend, shows us how deeply he has been impressed with the magnitude of the question, and how exhaustive has been the research he has devoted to its consideration.

Mr. Wollaston, in his 'Coleoptera Atlantidum,' avows the opinion that if a once-continuous tract of land were broken up by some natural catastrophe, and the insect forms which once overrun the whole, were thus divided into separate assemblages, the inevitable consequence would be a certain amount of external modification consequent upon the change.

Suppose, for instance, some vast continent, as the favourite Atlanta of geologists, were submerged and became the Atlantic ocean, a few mountain peaks or desert flats only remaining visible, as now exemplified in the Madeiras, Canaries, Cape Verdes and Azores, Mr. Wollaston feels it would require no stretch of the imagination to conclude "that a very large majority of such minute insular departures from a central form as those which we now meet with, would have resulted as a matter of course; and would have been rapidly matured from their respective types."

That these modifications or departures do occur no entomologist who has studied Mr. Wollaston's works or the insects he has described will for a moment doubt, but the word "rapidly" will rivet their attention, especially where the Lamarckian proclivity has once taken root in the mind. Mr. Wollaston perceives this, and adds the following explanatory remarks:—

"I say *rapidly* matured, because I have no reason to think that the small insular modifications to which I refer are the product of that slowly accumulating infinitesimal divergence, in a given uniform direction, which certain modern theories would suppose to be unceasingly going on throughout indefinite time, but which seems to me, in nine cases out of every assumed ten, to have no existence in the feral world. Such a process may occasionally be kept up by the persevering intervention of a true controlling cause, such as that which is implied by the skill and intellect of man; but we have no evidence that 'nature' (whatever the term may mean) is able to accomplish a task thus difficult, and which requires not only sagacity and design, but, in instances where το καλὸν is the special end to be attained, even imagination (in its highest sense). I need scarcely add that a denial of this Supreme power as inherent in 'nature' is perfectly compatible with a belief in those modifying external influences which all experience assures us are ever liable to act, within reasonable limits, and to leave their impress, upon organic structures, in accordance with the exact amount of pliability which has been allotted to each separate species; for this is totally distinct from that selective capability which we are accustomed to regard as an integral part of free agency and will. Mere variation we all know to be a fact; and, if its importance is by some exaggerated, no one has ever yet questioned its existence; but I believe it can seldom be said to 'accumulate' during more than a few generations, or ever to go on increasing in an undeviating course after the effect has been accomplished which is legitimately due to the combination of circumstances which occasioned it. Towards the close of my introductory observations in the 'Coleoptera Atlantidum,' I cited the Madeiran land-shells in support of this thesis, showing that, so far at least as they are concerned, we possess ocular demonstration that they have not altered during the enormous interval which must have elapsed since the commencement of their subfossil era, except that the *size* of a few of them appears to have been *suddenly* reduced (for there are no traces of the intermediate grades of stature, which must have been preserved under any process of a *gradual* dwindling down), as though consequent upon some physical catastrophe or depauperation, in the areas over which they had spread; and this, supported by other considerations, led me to infer that the many trifling insular departures which we meet with, from a central type, were *not*, in all probability, brought about by any slow and imperceptible method of long-continued, cumulative change, but in a comparatively short period (terminating when the natural conditions of the newly-acquired *habitats* had ceased to alter), and perhaps through the partial breaking up of this vast Atlantic province. At least some such inference seems borne out in many ways, and to accord with the two-fold fact that, while these trifling insular aberrations are everywhere conspicuous, we have at the same time most unmistakable evidence of what I may almost call the unchangeability of a large proportion of the present forms. And although it is true that my remarks arose out of Madeiran data, I am satisfied that they are equally applicable to the whole of these sub-African oceanic groups."—*Introduction*, p. xxxvi.

But why pursue a speculation that can lead to no satisfactory result? the evidence of actual metamorphosis is confined to the life-history of each individual; there is not, and cannot be, any evidence that it extends to species. On the other side, also, it must be admitted that the evidence is simply negative; no one can prove that metamorphosis *does not* take place; no one can show that the hippopotamus and the crocodile, the ostrich and the humming bird, the bird of paradise and the earth-worm, the sensitive plant and the spermaceti whale, *have not* descended from three or four, aye, even from one, primordial germ. Let me, therefore, leave these temptations to speculation, and devote the limited space at my command to statistics more relevant to Zoology as a science of facts.

Mr. Wollaston finds the Coleopterous fauna of the Cape Verdes to be comprised of two hundred and seventy-eight species: three of these are only indicated by fragments, the rest by perfect individuals; the whole are arranged by Mr. Wollaston under the following twelve primary divisions:—

Heteromera . . .	49	species.
Brachelytra . . .	42	„
Necrophaga . . .	39	„
Geodephaga . . .	39	„
Rhyncophora . . .	27	„
Priocerata	18	„
Cordylocerata . .	16	„
Phytophaga . . .	14	„
Pseudotrimera . .	14	„
Philhydrida . . .	13	„
Hydradephaga . .	7	„
Total . .	278	species.

Six islands were "partially" examined. I quote the word "partially" because used by Mr. Wollaston, but I believe the examination has been very much more complete than Mr. Wollaston's modesty would lead us to suppose. I give the names of these six islands, and append to each name the number of species that the island so called produced:—

S. Vicente . . .	132	species.
S. Jago	130	„
S. Antonio . . .	114	„

Fogo	93 species.
Brava	61 „
S. Nicolai . . .	27 „

A glance at the map will show that these numbers have no correspondence with the superficial area examined, since S. Nicolai, which has the fewest recorded species, has a larger superficies than S. Vicente, which has the largest number. I think it is scarcely necessary for me to add that the larger aggregate number in the second table arises from the fact that several species are common to two, three or more of the islands. The coleopterous genera which may be said to characterize this archipelago are Oxycara of the family Tentyriadæ, and Trichosternum of the family Opatridæ, both of them of course heteromerous, and both possessing slightly modified, although permanent, exponents in most of the islands—"exponents," says Mr. Wollaston, "which it is far from impossible may be in reality but insular phases of two aboriginal generic types." Then, as regards the entire absence from the Cape Verdes, of certain coleopterous families common to all continents, whatever their temperature, we have here an illustration of Man's power or influence in altering the original character of the fauna of any given tract. It would appear that all these islands, as well as the Canaries and Madeiras, were formerly inhabited by a race or species of man perfectly distinct from the European emigrants who now occupy the soil: whether the term Huanches properly applied to the whole or only to a portion of these aborigines, I will not pretend to say in the face of such authorities as Prichard and Latham; but whether the men who then "ran wild in woods," were of one or many races, it is quite certain they have expired, and with them those woods in which they ran. By the energetic white man the Huanche was converted, christianized, civilized, demoralized, diseased and destroyed: the first three terms are applied by the optimists; the last three are stern, truthful and incontrovertible —they are totally apart from sentiment or speculation. Now the invaders not only destroyed the natives, but the forests they inhabited, and with the forests perished the longicorns, the glory of all forest-clad countries. The euphorbian flora—strange, uncouth and distinct—still exists to some extent, and with it a euphorbian fauna; but both are rapidly disappearing, and it is by no means improbable that the naturalist visiting the Cape Verdes a century hence will prove to his own entire satisfaction that neither ever existed except in the fertile and fervid imagination of Mr. Wollaston and his reviewer. Such is history: one generation erects a monument to commemorate an event; the next generation obliterates the inscription that recorded the event. We all recollect in how skilful a manner Dr. Whately enveloped the existence of the first Napoleon in such a dense fog of doubt, that we rose from the perusal of his labours in a state of perfect bewilderment; and yet the name of Napoleon then filled every publication that issued from the press: every adult in the civilized world regarded Napoleon as the greatest name, whether for good or for evil, that history has preserved, and Whateley's essay was a mere satire on the sceptic, yet penned with such excessive skill that many scarcely knew whether he was in jest or earnest. Thus may the sceptic hereafter dispute inch by inch the facts which Mr. Wollaston has recorded with so much precision, and may prove from isothermal lines, oceanic currents, latitude and longitude, that the Euphorbiaceæ could never have grown in the Cape Verdes, and that therefore the euphorbian fauna must have been a myth.

I cannot leave this volume without expressing a hope that I shall find time and space to return to it again. The divisions which Mr. Wollaston has used are scarcely sufficient, since before the entomologist can obtain any satisfactory view of the coleopterous fauna of any country, he must have the species arranged under those families and family names with which he is familiar. Mr. Wollaston's labours enable me to do this, and I hope hereafter to tabulate the comparative statistics I have already began to extract.

EDWARD NEWMAN.

Ornithological Notes. By GEORGE ROBERTS, Esq.

Dates of Arrival of the Summer Migrants in 1868.—April 9th. Saw wheatear. 10th. Saw swallows about the River Aire. 20th. Saw yellow wagtail. 21st. Heard willow wren. 23rd. Cuckoo heard. 25th. Saw tree pipits in numbers: swallows more dispersed. 26th. Heard several cuckoos: heard whitethroat, whinchat and chiffchaff. May 3rd. Heard sedge warbler: saw house martin and sand martin. 6th. Heard lesser whitethroat and corn crake: whinchats numerous. 10th. Heard wood warbler and garden warbler: redstart, blackcap and spotted flycatcher not seen. Mr. J. A. Harvie Brown says the flycatcher is the first of the migrants to arrive in Stirlingshire

(Zool. S. S. 68): this is either a mistake or a singular fact; I should very much like to know which, for it is one of the last to arrive in England.

Rook.—April 4th. Rooks had young. On this date I noticed the old rooks flying regularly backwards and forwards over this village, bringing food for the young. About the 23rd of May the young must have been out; the old birds ceased flying over.

Fieldfare and Redwing.—These birds, which had been assembled in a coppice several days, in a flock of about a hundred, left here about the 22nd of April.

Cuckoo.—Cuckoos were numerous here from the 30th of April to the 30th of May. Since the latter date they have either ceased singing or been very scarce. I have only heard of one cuckoo's egg this year.

House Martin.—Out of ten lists of spring migrants which I have looked over this season I found the house martin mentioned but twice. This bird is certainly becoming scarcer: I only found the martin recorded about three times in all the lists that I examined in the 'Zoologist' and 'Field' last year. I feel convinced that it is a decreasing species. During a four days' tour in Craven and Lancashire this spring I noticed martins but twice (both at one village), and not one swift.

Swallow.—Dates of arrival of the swallow at Lofthouse for six years:—1862, April 25th; 1863, April 16th; 1864, April 13th; 1866, April 14th; 1867, April 18th; 1868, April 10th. Although swallows arrived about here somewhat early this spring a pair did not come to a shed in which they have built for four years till the 1st of May. I noticed them haunting the shed very irregularly (sometimes they were a week away) till the 28th of May: on that date I saw them repairing a two-year-old nest. The female is now (June 16th) sitting. When they were away I think they were in the valleys in quest of food. The nest now contains eggs, and I frequently see *three* old birds about it. Swallows are scarce in this neighbourhood: two or three observers have reported this fact to me from different localities.

Lesser Whitethroat.—This little bird came into my garden on the 5th or 6th of May. The call-note to the female reminded me of the first notes of the yellowhammer's song: it also has a note like the squeak of the shrew-mouse, uttered sharply and loudly. Its song is a low warble: it does not sing as it flies, like the greater whitethroat, but the feathers of the head are erected when it utters its call-note, and probably when it sings, but I have not noticed that point. It frequents huge trees like its congener. Its note of invitation to the female was was uttered very vociferously from the date of its arrival till the 30th of May; about then it began to decline, and now it is heard very seldom and weaker in tone.

Sky Lark.—Larks had young on the 5th of May. A cute bird-fancier, at a neighbouring village, placed, for the sake of convenience, four eggs of a lark in the nest of a robin, and the robin hatched and fed the young larks.

Importation of Birds.—I should like to warn amateur naturalists against the imposition of unprincipled dealers in this matter. A short time since a friend, Mr. George Parkin, of Wakefield, showed to me a blue-bird, a redwinged starling, an American robin and a woodpecker, which had been sent in the flesh from America: they were simply drawn and packed in common salt: the flesh was not decomposed and the birds were in excellent order.

GEORGE ROBERTS.

Lofthouse, near Wakefield.

Rare Captures for May, 1868.—During the past month I have had the following, in the flesh, except Sabine's snipe, which reached me stuffed, and which, after all, is no true species:—

May 2. Little bittern (female), taken alive in a field at St. Leonards.

May 7. Black tern (male), shot at Flamborough Head. Sabine's snipe (female), shot at Wareham, in Dorsetshire, by Mr. C. Churchill.

May 9. Ring ouzel (male). Cromer.

May 12. Kentish plover (female), killed near Rye.

May 20. Three reeves, from North Lincolnshire; excellent specimens.

May 30. Turnstone (female), in summer plumage. Tees-mouth.

May 31. A wild turtle (female), from Sunderland (doves are rare so far North), and a pair of garganeys from the vicinity of Bridlington.—*J. H. Gurney, jun.; Bank, Darlington.*

First Arrivals of Spring Visitors observed at or near Minehead, Somersetshire, in 1868.—March 21st. Wheatear (male). 27th. Wheatear (female). April 10th. Yellow wagtail (male). 17th. Chimney swallow. 19th. Willow wren. 23rd. Redstart (male). 24th. Pied flycatcher (one pair seen together). 25th. Cuckoo and sand martin. 29th. House martin, greater whitethroat and whinchat (male). May 5th. Swift.—*J. H. Gurney; May* 30, 1868.

Montagu's Harrier near Falmouth.—Nearly all the specimens of this harrier which I have observed have been without the ash-coloured plumage; the two exceptions have been very far from being unsullied, but sufficiently so to show distinctly the black bar in the wing, and light bay spots on the flanks and outer tail-feathers. A specimen of this description came under my notice to-day, killed near Carclew. —*Edward Hearle Rodd; Penzance, June* 12, 1868.

Thrush singing while flying.—With reference to Mr. Hensman's note (Zool. S. S. 1218) on a thrush singing while flying, it may be interesting to him to know that a similar circumstance has lately come under my own observation: as one day in April I noticed a blackbird fly some distance from one tree to another, in full song the whole time; and, on the same day, a chaffinch flew off the road in front of me to a neighbouring tree, and when about mid-way burst into its joyous little song.—*G. F. Mathew; Dartmouth, May* 23, 1868.

Nidification of the Bohemian Waxwing in England.—Does the Bohemian waxwing (*Ampelis garrulus*) ever breed in this country? The following facts would cause us to believe that it occasionally does so. A male bird was shot here in January last, and towards the end of April a pair of them were seen in a tree near this house. On Sunday, the 31st of May, a young one was caught by my butler while entangled in some rough grass near a fine specimen of Pinus Douglasii in my pleasure-ground: he perceived no red marks on the wing-feathers, but on the crown of the head the rudiments of the future crest were apparent. After having kept it in a small box for more than half an hour he placed it on the top of the iron railing, where the old birds immediately came to it, both the male and the female: the latter was more shy than the former, and would not permit his near approach; the former was much more brilliant in the plumage, and he distinctly saw the red marks at the tip of the wings: having watched them all for some time, he saw them take flight upon his return, and as they flew away to some trees near the spot he observed similar yellow bands on the tails of both the old birds. The whole family were noticed at intervals in the same locality for upwards of a week afterwards by my butler, gamekeeper and gardener, but they could not succeed in capturing any of them. What we took to be the nest was placed on the upper side of a branch of the Douglas's pine, about twenty yards above the ground, and consisted of wool, intermixed with fibres of grass and bits of the same fir: its shape was quite destroyed in our attempts to take it down.—*Oswald Mosley; Rolleston Hall, near Burton-on-Trent, June* 13, 1868.

Willow Wren's Nest in a Magpie's.—On the 31st of May I found a willow wren's nest and six eggs placed on the top of an old (wood pigeon's?) nest in a dead fir tree, about fifteen feet from the ground. To make sure that it was not a wren's nest I laid down on the ground, and soon saw the bird go into the nest: she had doubtless flown out as I ascended the tree. I have never before found the willow wren's nest more than a foot from the ground, and this, I think, only twice, though a gentleman showed me a nest, two or three years ago, which had been built in a yew tree two or three feet from the ground.—*John S. Thomasson; Moorfield, Bolton, June* 1, 1868.

Quails in Suffolk.—About the 20th of May several quails arrived in the neighbourhood of Scole, where they seem to be disposed to breed, and I need hardly add that the gentleman on whose estate they have made their appearance will not permit them to be molested.—*Alexander Clark-Kennedy; Little Glenham, Wickham Market, May* 28, 1868.

Quails nesting near Henley-on-Thames.—Last Monday, the 8th of June, I had eleven eggs of the quail brought me; they were mown out in an upland grass-field, at Remenham, in our neighbourhood. This is the first time I have met with the eggs of the quail in our vicinity.—*Charles E. Stubbs; Henley-on-Thames, Oxon, June* 14, 1868.

Little Bittern at Braunton, North Devon.—I have been informed that, in the first week of May, a little bittern was killed at Braunton, near Barnstaple, by one of the keepers of Sir W. Williams, Bart.—*M. A. Mathew; Weston-super-Mare, May* 19, 1868.

Spoonbill on the Norfolk Coast.—Two immature male birds were shot on the 4th of May near Yarmouth. Both birds were apparently about the same age, but one was much larger, weighing four pounds, the other only three and a half pounds: they were both rather fat. A day or two afterwards, I was told, a beautiful old male was shot in the same locality.—*T. E. Gunn; Norwich.*

Rare Sea Birds.—Within the last few months I have skinned the following sea birds:—Little gull (2), Iceland gull, glaucous gull (5), greater shearwater, Fulmar petrel, spotted redshank, little auk (3), gray phalarope, pomarine skua (3), great skua, and ringed guillemot. I can furnish full particulars; several were given me by my friend Mr. J. Gatcombe.—*J. H. Gurney, jun.; Bank, Darlington.*

A strange Bird.—Copiapo, Chili, April, 1868. Yesterday, at about five o'clock in the afternoon, when the daily labours in this mine were over, and all the workmen were together awaiting their supper, we saw coming through the air, from the side of the ternera, a gigantic bird, which at first sight we took for one of the clouds then partially darkening the atmosphere, supposing it to have been separated from the rest by the wind. Its course was from north-west to south-east; its flight rapid and in a straight line. As it was passing a short distance above our heads we could mark the strange formation of its body. Its immense wings were clothed with a grayish plumage, its monstrous head was like that of a locust, its eyes were wide open and shone like burning coals; it seemed to be covered with something resembling the thick and stout bristles of a boar, while on its body, elongated like that of a serpent, we could only see brilliant scales, which clashed together with a metallic sound as the strange animal turned its body in its flight.—*Copiapo (Chili) paper.*

Large Sturgeon in the Severn.—It may be interesting to some of the readers of the 'Zoologist' to know that on Thursday, the 28th of May, a sturgeon was caught in the Severn, near Newnham, and kept alive by being anchored in the river till Saturday morning. The fish measured seven feet eight inches long: I have not yet been able to get at its weight.—*Edward Sweetapple.*

Homelyn Ray and Gemmeous Dragonet off Plymouth.—I have just received a specimen of the Homelyn ray (*R. maculata*), the smallest I ever saw: it was a male, 6 inches long over all, 2½ inches long from the snout to the origin of the tail, which, as will be seen, was of the disproportionate length usual in young rays; across the wings from tip to tip the fish was 3½ inches: the spots were developed, but disappeared soon after death: the spines were all developed in the precise order given by Yarrell. The same trawl which took this fish took the yellow skulpin or gemmeous dragonet (*Callionymus Lyra*) and the Asterias Placenta of Pennant.—*Thomas Cornish; Penzance, May* 14, 1868.

Notes on Aphides. By FRANCIS WALKER, Esq., F.L.S.

(Continued from S. S. 1123.)

Genus 7. APHIS, *Linn.*

Front flat or convex. Antennæ not seated on a frontal tubercle, smooth, generally shorter than the body; seventh joint longer than the sixth, or at least as long. Nectaries cylindrical or attenuated from the base, rarely very small, very rarely none. Tail more or less prominent, sometimes none. Cubital vein of the fore wings twice-forked.

Typical species, *A. Sambuci*, Linn.

A. Tail more or less conspicuous.
A. Nectaries longer than the tail.
A. Body green, or luteous-green, or olive, or ochraceous or lemon-colour, sometimes very pale.
a. Body powdered.
* Nectaries surrounded by rust-colour at the base.
† Nectaries cylindrical, lutescent, black at the tips. . . . 1. *Padi.*
†† Nectaries black; tips paler, attenuated. . . 2. *Cratægi.*
** Nectaries not surrounded with rust-colour at the base.
† Abdomen green-gray, with dorsal transversely arranged and with marginal black points. . . . . 3. *Brassicæ.*
†† Abdomen green or greenish brown, with no dorsal points, at least in the apterous form.
‡ Antennæ half the length of the body. Nectaries black. 4. *Avenæ.*
‡‡ Antennæ as long as the body. Nectaries green in the apterous form, black in the winged form. . . 5. *Lactucæ.*
a. Body not powdered.
* Nectaries green or whitish, or lutescent; the extreme tips sometimes black or brown.
† Tail as long as half the length of the nectaries or longer.
‡ Abdomen green.
§ Dorsum dull, of one colour. . . . 6. *Nasturtii.*
§§ Dorsum varied with brown. . . . 7. *Clinopodii.*
‡‡ Abdomen luteous-green, sometimes marked above with longitudinal green lines.
§ Body broadly oval, obtuse behind. Antennæ half the length of the body. . . . . . . 8. *Malvæ.*
§§ Body oblong oval, acute behind. Antennæ nearly as long as the body. . . . . . 9. *Eupatorii.*
†† Tail shorter than half the length of the nectaries.
‡ Nectaries extending beyond the tip of the abdomen.
§ Nectaries long, very pale. Tail brownish green. 10. *Saliceti.*
§§ Nectaries moderately long, like the tail in colour. 11. *Urticæ.*

‡‡ Nectaries not extending to or beyond the tip of the abdomen.

§ Nectaries thicker at the base. . . 12. *Prunina.*

§§ Nectaries quite cylindrical.

|| Body bright green. Antennæ with all the joints cylindrical. . . . . . . 13. *Ballotæ.*

|||| Body luteous-green. Antennæ with the fifth and sixth joints distinctly clavate. . . 14. *Helichrysi.*

** Nectaries wholly black or brown.

† Tail very small, hardly visible.

‡ Body ochraceous. Rostrum extending to the middle legs. 15. *Sambucaria.*

‡‡ Body bright yellow. Rostrum extending to the hind legs. 16. *Verbasci.*

†† Tail more or less long.

‡ Tail more than half the length of the nectaries. . 17. *Chloris.*

‡‡ Tail as long as half the length of the nectaries, or shorter.

§ Abdomen of the viviparous winged female with black marginal points. . . . . . . 18. *Symphiti.*

§§ Abdomen of the viviparous winged female with no black marginal points.

|| Antennæ of the viviparous winged female longer than the body. . . . . 19. *Scabiosæ.*

|||| Antennæ of the viviparous winged female as long as the body, or shorter.

¶ Body intensely green. Antennæ brown.

+ Neck mucronate on each side. Rostrum extending to the hind legs. . . . 20. *Plantaginis.*

++ Neck unarmed. Rostrum not extending beyond the middle legs. . . . . 21. *Capsellæ.*

¶¶ Body grass-green. Antennæ whitish.

+ Abdomen wholly green . . . . . 22. *Mali.*

++ Border and tip of the abdomen brown, the same black in the viviparous winged female. . 23. *Solanina.*

AA. Body black, or brown, or blackish green.

a. Abdomen above brownish lutescent at the base. Antennæ as long as the body. . . . . 24. *Polianthis.*

aa. Abdomen nowhere lutescent above. Antennæ shorter than the body.

* Dorsum shining.

† Head green. Tail very small, hardly visible. . . 25. *Cardui.*

‡‡ Head black. Tail quite apparent. . 26. *Medicaginis.*

** Dorsum dull.

† Body blackish green.

‡ Tail black, a little shorter than the nectaries. . 27. *Sedi.*

‡‡ Tail green or white, much shorter than the nectaries.

§ Antennæ as long as the body. . . 28. *Frangulæ.*

§§ Antennæ shorter than the body.

|| Body ovate-oblong. Nectaries hardly twice longer than the tail, which is whitish. . . . . 29. *Punicæ.*
|||| Body oval. Nectaries more than twice longer than the tail, which is dingy green. . . 30. *Consolidæ.*
†† Body black or brown.
‡ Nectaries pale at the tips. Tail luteous-brown at the base. 31. *Euonymi.*
‡‡ Nectaries and tail wholly black or brown.
§ Tail shorter than half the length of the nectaries.
|| Middle and hind femora whitish, brown only at the tips. 32. *Hederæ.*
|||| Middle and hind femora black, paler only at the base.
¶ Third and fourth joints of the antennæ wholly white. Nectaries short, cylindrical. . . 33. *Intybi.*
¶¶ Third and fourth joints of the antennæ black, hardly whitish at the base. Nectaries long, attenuated at the tips. . . . . 34. *Sambuci.*
§§ Tail as long as half the length of the nectaries, or longer.
|| Rostrum extending to the hind legs, or at least distinctly extending beyond the middle legs.
¶ Body olive-brown. Fourth and fifth joints of the antennæ equally long. Wings yellowish. . . 35. *Silybi.*
¶¶ Body black or brownish black. Fourth joint of the antennæ longer than the fifth. Wings not yellowish. 36. *Viburni.*
|| Rostrum not extending beyond the middle legs.
¶ Tail greenish brown. . . . . . 37. *Nerii.*
¶¶ Tail black.
-+- Tail as long as half the length of the nectaries. Pupæ with no white points on the dorsum. 38. *Laburni.*
-+-+- Tail more than half the length of the nectaries. Pupæ with white points on the dorsum.
++ Antennæ white, hardly brown at the tips. Femora from the base to the middle and tibiæ white. 39. *Papaveris.*
++++ Antennæ brown, hardly paler at the base. Femora at the base and tibiæ lutescent. . 40. *Rumicis.*

AA. Nectaries as long as the tail, or shorter.
A. Nectaries and tail at least twice longer than broad.
a. Body black, or blackish green.
* Body bluish powdered. Nectaries as long as the tail. . 41. *Craccæ.*
** Body smooth, or if slightly powdered, then the nectaries distinctly longer than the tail.
† Body greenish brown. Tail as long as the nectaries. 42. *Serpylli.*
†† Body black. Tail longer than the nectaries.
‡ Nectaries cylindrical, distinctly shorter than the tail. 43. *Genistæ.*
‡‡ Nectaries thicker at the base, hardly shorter than the tail. 44. *Euphorbiæ.*

aa. Body bright green, or luteous-green.
* Body white-powdered.
† Antennæ as long as half the length of the body. Nectaries and tail brown; coxæ black. . . . . . 45. *Cucubali.*
†† Antennæ as long as one-third of the body. Nectaries and tail pale green. Coxæ whitish or hardly brownish. . 46. *Atriplicis.*
** Body not white-powdered.
† Dorsum of one colour, or with deeper. Nectaries and tail pale, the former sometimes with brown tips. . . 47. *Origani.*
†† Dorsum with deeper longitudinal striæ. Nectaries and tail black. 48. *Beccabungæ.*
AA. Nectaries and tail very short, about as long as broad.
a. Body pale green. . . . . . 49. *Carotæ.*
aa. Body brown.
* Rostrum reaching or extending beyond the hind legs. Dorsum wholly powdered. . . . . . . 50. *terricola.*
** Rostrum not extending beyond the hind legs. Dorsum powdered excepting two spaces and a transverse line, rarely quite bare. 51. *Donacis.*

AA. Tail none or not visible.
A. Nectaries more or less long.
A. Body shining.
a. Dorsum green, with black shining and sometimes confluent black bands. 52. *Persicæ.*
aa. Dorsum of one colour.
* Colour bright green. . . . . 53. *Myosotidis.*
** Colour black or brown.
† Nectaries slender, longer than the fore femora. . 54. *Centaureæ.*
†† Nectaries rather thick, much shorter than the fore femora.
‡ Abdomen of the viviparous winged female deep black and shining beneath. . . . . . . 55. *Prunicola.*
‡‡ Abdomen of the viviparous winged female brownish black and dull beneath, only the anal folds shining. . 56. *Tragopogonis.*
AA. Body powdered.
a. Viviparous winged female with a black dorsum. . 57. *Ranunculi.*
aa. Viviparous winged female with an olive-green dorsum, with a black dorsal spot and with black marginal points. . . 58. *Lappæ.*
AA. Nectaries wholly wanting. . . . . . . 59. *Gallarum.*

Genus 8. SIPHOCORYNE, *Passerini.*

Nectaries clavate, more or less long. In other characters like Aphis.

Typical species, *Aphis Xylostei,* Schrank.

A. An oblong little horn above the tail. . . . . 1. *Capreæ.*
AA. No horn.

A. Body dingy lutescent or greenish. Abdomen rust-colour or black about the nectaries. . . . . 2. *Fœniculi.*
AA. Body green, powdered. Abdomen not rust-colour nor black about the nectaries. . . . . 3. *Xylostei.*

Genus 9. MYZOCALLIS, *Passerini.*

Viviparous apterous female and pupa with a hairy or bristly dorsum. Nectaries very short, tubercle-shaped. In other characters like Aphis.

Typical species, *Aphis Coryli*, Goetze.

A. Apterous form and pupa with a tuberculate setulose dorsum. . 1. *Ononidis.*
AA. Apterous form and pupa with the dorsum pilose or setulose, not tuberculate.
A. Winged form with the dorsum tuberculate at the base.
A. Abdomen bare, with four dorsal tubercles. . . 2. *Quercus.*
AA. Abdomen with white down, with one dorsal tubercle. . 3. *Quercea.*
AA. Winged form with the dorsum not tuberculate. . . 4. *Coryli.*

Genus 10. CLADOBIUS, *Koch.*

Antennæ hairy; seventh joint at least as long as the sixth. Nectaries cylindrical, at least twice longer than thick.

Typical species, *Aphis populea*, Kaltenbach.

A. Nectaries rather long, almost reaching the tip of the abdomen. 1. *Lantanæ.*
AA. Nectaries very short, remote from the tip of the abdomen. . 2. *populea.*

Genus 11. CHARTOPHORUS, *Koch.*

Antennæ setaceous, distinctly pilose; seventh joint longer than the sixth. Nectaries obtuse, very short, shorter than their thickness. Tail wart-shaped.

Typical species, *Aphis Aceris*, Fabr.

AA. Abdomen white, with black bands. . . . 1. *leucomelas.*
AA. Abdomen green or black.
A. Abdomen grass-green, with darker spots or points in longitudinal series.
A. Abdominal spots confluent, forming two curved stripes. . 2. *Capreæ.*
AA. Dorsal and marginal points distinct, the former in two series. 3. *salicivora.*
AA. Abdomen green with darker bands or black.
A. Stigma dingy luteous-green, bordered with brown. . 4. *Aceris.*
AA. Stigma wholly brown or black.
a. Abdomen green, with black bands and with black marginal points.
* Veins of the fore wings clouded with brownish black. . 5. *Vitellinæ.*
** Veins of the fore wings not clouded. . . . 6. *versicolor.*
AA. Abdomen black above.

a. Abdominal incisures luteous. . . . . . 7. *Populi*.
aa. Abdominal incisures of the ground hue. Abdomen bordered with green and brown at the tip. . . . . 8. *Salicti*.

Genus 12. PTEROCALLIS, *Passerini*.

Antennæ with the seventh joint shorter than the sixth. In other characters like Myzocallis.

Typical species, *Aphis Alni*, Fabr.

A. Abdomen with black marginal points. Veins of the fore wings with triangular brown spots at the tips. . . . . 1. *Tiliæ*.
AA. Abdomen without marginal points. Veins of the fore wings not or hardly dilated at the tips. . . . . . . 2. *Alni*.

Genus 13. TRAMA, *Heyden*.

Antennæ with seven joints; third joint longest; seventh extremely small. Legs long; hind tarsi with one joint. Winged form unknown.

1. *Troglodytes*.

Genus 14. PARACLETUS, *Heyden*.

Antennæ short; third, fourth and fifth joints nearly equal in length; seventh very small. Abdomen depressed; no nectaries. Legs long; tarsi two-jointed. Winged form unknown.

1. *cimiciformis*.

(To be continued.)

How Spiders begin their Webs.—Early in the spring of 1866, while arrangements were making for photographing a live male of the Nephila plumipes (the so-called "silk spider of South Carolina"), the spider, after having several times traversed the circle of wire on which it was, suddenly stopped, took a firm position at the top of the frame and lifted the abdomen, pointing it towards a large skylight which occupied the middle of the ceiling: a slender shining thread was seen to shoot forth from the spinnerets which occupy the end of the abdomen; it seemed to have a blunt rounded extremity, which advanced through the air rather quickly for a few inches, but afterwards more slowly and steadily, and with an upward tendency, but always in the direction of the skylight. When it had reached the length of five or six feet, I allowed it to become attached to my coat; the issue ceased at once, and the spider, having attached the end of the line, turned about and began to pull upon it. I now broke it off near the wire, and, believing that there was a current of air toward the skylight, I blew gently upon the spider from various directions, and found that it always pointed its abdomen in the direction in which I blew, and that the thread was emitted in the same direction. So that while it seemed to have the power of projecting a thread for a short distance, yet it always availed itself of the prevailing current of air.—*B. G. Wilder, in the 'American Naturalist' for June*, 1868.

PROCEEDINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY.

June 1, 1868.—H. W. BATES, Esq., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Verhandlungen der K. K. zoologisch-botanischen Gesellschaft in Wien,' vol. xvii.; presented by the Society. 'Stettiner Entomologische Zeitung,' 1868, Nos. 4—6; by the Society. 'On the Diurnal Lepidoptera of the Extra-tropical Northern Hemisphere,' by W. F. Kirby; by the Author. 'The Odonat-Fauna of the Island of Cuba,' by Dr. H. Hagen; by the Author. Newman's 'British Moths,' No. 18; by the Author. 'The Zoologist' for June; by the Editor. 'The Entomologist's Monthly Magazine,' for June; by the Editors.

The following addition, by purchase, was also announced:—C. G. Thomson, 'Skandinaviens Coleoptera,' vols. viii. and ix.

Election of Members.

G. P. Shearwood, Esq., of Cedar Lodge, Stockwell, was elected a Member; Il Cavaliere Francfort, of Pallanza, Lago Maggiore, was elected a Foreign Member.

Exhibitions, &c.

The Secretary announced that an exhibition of useful and destructive insects would take place in the Palais de l'Industrie, at Paris, during the month of August. The Committee of Management includes Dr. Boisduval, M. Guérin-Méneville, and other entomologists and scientific agriculturists. The exhibition is to be made as comprehensive as possible, the scheme including the propagation of useful insects, methods of curing or preventing disease, and economical management; and the illustration of destructive insects, with means for opposing their ravages. As regards destructive insects, the Committee has determined on a practical instead of a scientific classification, the subdivisions being formed by the plants upon which the creatures feed. Foreigners are invited to take part in the coming exhibition; applications to be sent in before the 20th of July, to the Secretary of the Société d'Insectologie Agricole, No. 1, Rue Cadette, Paris, or at the Palais de l'Industrie. The insects or other objects of exhibition are to be sent in before the 25th of July, and the exhibition opens on the 1st and closes on the 31st of August. The following are the principal heads of classification:—First division—Useful insects:—1st class, Silk-producing insects; 2nd class, Insects producing honey and wax; 3rd class, Insects used in dyeing and for colour; 4th class, Edible Insects, crustacea and mollusks; 5th class, Insects employed for medical use; 6th class, Insects used as ornaments. Second division—Destructive insects:—Ten classes, *viz.* those which attack cereals, the vine, plants used in industry, forage, vegetables and ornamental plants, fruit trees, forest trees, timber used for building, truffles and fungi, dry organic matters, and, lastly, parasites of man and domestic animals. The third division includes three classes—carnivorous insects, parasitic insects; destructive of chrysalides; and insectivorous animals, birds and reptiles. The fourth division includes—Insects and other creatures destructive of mollusks; and notices respecting edible snails and the benefit that cultivators may derive from them. Lastly, optical instruments for entomological purposes, and special apparatus connected with the rearing or destruction of insects. Printed or written memoirs are also to be admitted, even without specimens of the insects to which they refer; and it is further announced that conferences will take place in the exhibition on various subjects connected with "insectology" [? Entomology].

Mr. M'Lachlan exhibited the larva of a caddis-fly found by Mr. Fletcher, of Worcester, crawling about the bark of willow trees: the case was like a Coleophora, but the feet of the larva showed it to be Trichopterous, not Lepidopterous. Enœcyla [Enoicyla] pusilla, a species of which the female was apterous, had for some time been known on the Continent to have a non-aquatic larva, and M. Snellen van Vollenhoven found the larvæ in great numbers at the Hague: this species had not yet been found in Britain, but Mr. Fletcher's larvæ were probably to be referred to it. It would be interesting to ascertain how the larva breathed, whether or not by spiracles.

Mr. J. Jenner Weir called attention to the Report, in the 'Journal of Horticulture' for May 21, 1868, of the Proceedings of the Scientific Committee of the Royal Horticultural Society, in which it was stated that on the 19th of that month "Mr. Berkeley exhibited specimens of the larva of Coleophora hemerobiella, which attacks the leaves of the pear and cherry, not as is usually the case by eating away the whole substance, but by attaching themselves by their discoid suctorial mouth, and extracting the sap from the parenchyma for some distance round the point of attack; which when they have exhausted they leave, and commence an attack in another part of the leaf, leaving a small hole similar to a leech bite. Finally they enclose themselves in the leaf, which is rolled up into the form of a tiny cigarette." Mr. Weir presumed that no one of the entomologists attached to the Scientific Committee could have been present at the promulgation of a statement so full of error.

Mr. Keays exhibited specimens of Psyche crassiorella from Hornsey Wood.

The Hon. T. De Grey exhibited pupæ of Hypercallia Christiernana; the larvæ were found on Polygala vulgaris between the 27th of April and the 22nd of May, near Shoreham, and one became a pupa during the Meeting. The pupæ were of a beautiful bright green colour, attached by their hind extremity only to the sides of the glass cylinder in which they were exhibited, and were not suspended loosely by the silken attachment, but rigidly fixed in an oblique position at an angle of about 60° to the side of the cylinder.

Mr. A. G. Butler (who was present as a visitor) exhibited a small and pale variety of Nemeobius Lucina, and a pair of Anthocharis Cardamines, all from Herne Bay. Both sexes of A. Cardamines were remarkable for the largeness of the black spot on the disk of the fore wings, and the male had a rudimentary tail to the hind wings.

Mr. Burmeister, jun. (who was present as a visitor), exhibited numerous drawings of larvæ of Brazilian butterflies, and pupa-skins of many of them. Amongst the latter was Ageronia Amphinome, remarkable for its pair of foliate appendages to the head, which, however, did not contain the antennæ of the butterfly: this pupa was not distinguishable from other Nymphalidæ, and showed that the old authors who described it as having a belt of silk round the middle were mistaken.

Mr. Burmeister also mentioned that he had found the larvæ of Castnia in the bulbs or swellings at the foot of the stem of Orchids.

Mr. Edward Sheppard read the following extract from a letter written by Mrs. Russell, of Kenilworth,—the beetle referred to being a Meloe:—

"An evening or two ago I watched a beetle for an hour in the garden excavating a hole in the earth of one of the beds, big enough to hold its own large long body. It was evidently a female, full of eggs. It bit off little pellets of earth from the rim of its hole and cast them away with its hind feet, turning itself about in every direction, and working without a moment's cessation. It had very large, thick antennæ, and was plainly a very powerful creature, rolling down pieces of the dry crumbling earth half as big as itself, and not minding them a bit. Next morning I went to see the state of affairs, and found, to my astonishment, the excavation completely filled up, and smoothed over, as if some one had passed their hand over the finely-powdered soil. Thinking it possible she might have buried herself, I searched the place well with a stick, but there was no trace of her, and I therefore conclude that she had been laying some eggs and covering them up."

Prof. Westwood gave an account of his observations of Ateuchus sacer at Cannes, and mentioned that during flight the elytra were perfectly horizontal and very slightly open at the suture, so that the motion of the wings was confined within very narrow limits. The action of the beetles in rolling along the ground the ball or pellet of dung in which the female deposits her eggs was most curious: with head pressed down and hind feet raised aloft, with its back to the pellet and moving backwards, one beetle pushed and guided the ball with its hind legs, whilst another beetle clung to the ball, and remaining motionless thereon was rolled over and over with it, sometimes uppermost, sometimes undermost. [See the account of Ateuchus variolosus given by "Ionicus" in 'The Entomological Magazine,' vol. iii. p. 377.]

Mr. Keays exhibited oak-leaves from Hornsey Wood, which were cut straight across the middle, leaving only the midrib, and the outer halves then twisted and rolled up by Attelabus Curculionoides, with a view to oviposition.

The Hon. T. De Grey exhibited specimens of Agapanthia Cardui, bred from larvæ in stems of thistles.

Mr. A. G. Butler exhibited Otiorhynchus picipes, which had been found destructive to rose trees at Manchester, eating off the young shoots.

Paper read.

The following paper was read:—"Descriptions of New Genera and Species of Heteromera," by Mr. Frederick Bates. Two new genera of Tenebrionidæ, from Australia, were characterized under the names of Hypaulax and Chileone.

New Part of 'Transactions.'

Trans. Ent. Soc., third series, vol. iv., part 5, published in May, completing that volume, and containing Mr. A. R. Wallace's Catalogue of Malayan Cetoniidæ, with four coloured plates, was on the table.—*J. W. D.*

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